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**LABORATORIES and
FUNCTIONS of the**

Eastern Marketing & Nutrition Research Division

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1971

★ **Wyndmoor, Pa.**

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OTHER LABORATORIES AND FIELD STATIONS:

- ★ Washington, D. C.
- ★ Beltsville, Md.
- ★ E. Grand Forks, Minn.
- ★ Waltham, Mass.

**Agricultural Research Service
U. S. DEPARTMENT OF AGRICULTURE**

U. S. Department of Agriculture Agricultural Research Service

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EASTERN MARKETING AND NUTRITION RESEARCH DIVISION

Dr. I. A. Wolff
Director

In 1938, Congress authorized the establishment of four Regional Research Laboratories around the country for the conduct of basic and applied research to find new and wider uses for American farm commodities. The Eastern Regional Research Laboratory was constructed in the Philadelphia suburb of Wyndmoor, Pa. This laboratory, still often referred to by its original name, is now the headquarters of a complex of laboratories known collectively as the Eastern Marketing and Nutrition Research Division (EMN).

Research is conducted in these EMN laboratories on animal products: dairy, meats, fats, and leather; and plant products: fruits and vegetables, and maple sap and sirup.

Most of the laboratories where this work is done are located at Wyndmoor. Others are the Dairy Products Laboratory, located in Washington, D. C., and Beltsville, Md.; Potato Processing Investigations of the Plant Products Laboratory in East Grand Forks, Minn.; and the Pioneering Research Laboratory of Physical Biochemistry at Brandeis University, Waltham, Mass. For addresses, see page 21.

For the locations and fields of research of other divisions of Marketing and Nutrition Research, see page 24.



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OFFICE OF THE DIRECTOR

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PLANT MANAGEMENT

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LABORATORIES

ANIMAL FAT PRODUCTS LABORATORY

Chief:

DR. G. MAERKER

The Animal Fat Products Laboratory is divided into four investigations groups. Three of these are concerned with the development of specific products from animal fats in the fields of plastics, lubricants, and detergents; and the fourth is conducting exploratory research on the reactions of these fats and their fatty acids and derivatives.

Plastics Investigations

Head: DR. A. N. WRIGLEY

1. *Plasticizers from Animal Fat Derivatives.* Animal fat derivatives made by epoxidation, carboxylation, hydroxylation, and oligomerization are evaluated as plasticizers and as internal and external modifiers for polymers.

2. *Polymerization of Animal Fats.* Monomers, polymers, and copolymers are prepared from animal fats. Copolymerization mechanisms and parameters are studied and evaluated, and the physical-chemical characteristics of the copolymers are investigated.

3. *Structure of Polymers.* The relation of structure to the physical properties of long-chain compounds, polymers, and copolymers is studied.

Lubricants Investigations

Head: DR. I. SCHMELTZ

1. *New Lubricant Components.* New fatty chemicals useful as lubricant components are sought by applying novel, as well as known, reactions to animal fats, their component fatty acids, and their derivatives. New products are evaluated as base oils, additives, and grease thickeners.

2. *Alkylene Oxides and Imines.* The reactions of fat-derived epoxides and aziridines are studied in detail and their mechanisms explored for the purpose of preparing suitable lubricant components. Reaction products are further modified in the light of test results.

3. *Special Oils from Animal Fats.* Liquid saturated fatty acids with potential utility are prepared from naturally occurring fats. Possible substitutes for sperm whale oil are formulated from various natural fats and from combinations or modifications of these fats.

Detergents Investigations

Head: DR. W. M. LINFIELD

1. *Synthesis and Analysis.* Surface-active agents and detergent additives that will have minimum effects

upon the ecology are synthesized from animal fats or from raw materials derived from them. The functional effectiveness of the synthesized compounds is maximized by studying the relationships between chemical structure and surface activity.

2. *Phosphate-Free Detergents.* Soap formulations containing lime-soap dispersing agents and other additives are developed for use in phosphate-free household and industrial detergents, and they are evaluated for their detergency and other surface-active properties.

3. *Biodegradability.* Surface-active agents and other detergent and surfactant components are examined under nonaerobic, aerobic, and microaerophilic conditions to test the ease of their decomposition by natural organisms.

Exploratory Reactions Investigations

Head: DR. L. S. SILBERT

1. *Regiospecific Reactions.* Reactions are investigated which are designed to make use of the unactivated centers in saturated and unsaturated fatty acids and other derivatives from animal fats. Unusual rearrangements and reaction mechanisms are explored.

2. *Peroxides.* Peroxides are prepared from animal fats, and their chemical and physical properties and applications are investigated.

3. *New Chemical Intermediates and Applications.* Animal fats are further modified by the introduction of reactive ester, sulfur, and other functional groups in order to synthesize new chemical intermediates. These compounds are investigated for their potential commercial and consumer utility.

4. *Spectroscopic Studies.* Spectroscopy, especially nuclear magnetic resonance, is utilized to study the properties of fats and their derivatives and to aid in the characterization and identification of new products.

MEAT LABORATORY

Chief:

VACANCY

(Acting: DR. J. NAGHSKI)

The Meat Laboratory conducts research aimed at improving the quality of meat and meat products and developing better methods of handling, preserving, and processing meats. The investigations are carried out in the areas of composition and quality, flavor, microbiology, and product stability.

Composition and Quality Investigations

Head: C. E. SWIFT

1. *Meat Proteins.* The bio- and physicochemical characteristics of meat proteins and their interactions with the nonprotein components of meat, such as fat and minerals, are studied.

2. *Composition and Structure Related to Quality.* The protein and other chemical components of meat are related to its structure and to qualities such as tenderness and juiciness, which may be dependent on structure.

3. *Improvement in Meats and Meat Products.* Basic knowledge of meat composition and structure is applied to improve methods of handling, processing, and storing meats so that the products obtained will have more tenderness and juiciness and better color, and so that meats from all commercial grades and cuts will be utilized to their optimum.

Meat Flavor Investigations

Head: DR. A. E. WASSERMAN

1. *Flavor Chemistry.* The chemical precursors of meat flavor are identified and their reactions to form flavorful compounds are investigated both chemically and organoleptically.

2. *Wood Smokes.* The wood smokes used in meat processing are studied to determine their chemical composition and the interaction of their components with meat constituents.

3. *Improvement in Meat Flavor.* Results of these flavor studies are applied to the production of new and improved meat products.

4. *Public Health Aspects.* Compounds added to meat, or formed as a result of processing, that may be of concern from a public health standpoint are studied. Methods of identification and assay are developed and mechanisms of formation investigated in order to control their production.

Microbiology Investigations

Head: (Vacancy)

1. *Microbial Flora.* The microbial flora of meat and meat products is studied. This includes work on both beneficial and undesirable microorganisms and aspects of meat safety.

2. *Improved Preservation of Meat.* New and improved methods of preservation, involving such measures as pasteurization and irradiation or the use of antibiotics or other antimicrobial agents, are developed.

3. *Biochemical Effects of Microorganisms.* The fats and proteins of meat are studied to determine how they are affected biochemically by microorganisms growing at low temperatures or during meat processing, and the knowledge obtained is applied in an effort to develop better products.

4. *Microorganisms and Meat Quality.* Relationships between flavor, keeping quality, and processing methods and the microorganisms associated with meat products are studied in order to develop new and improved products and processing methods.

Product Stability Investigations

Head: (Vacancy)

1. *Processed and Freezer-Stored Meats.* Interrelationships between the biochemical and organoleptic changes involved in the processing and freezer-storage of meat and meat products are studied.

2. *Rancidity*. The chemical nature of rancidity is under study and means of retarding its development are being investigated.

3. *Enzymes and Meat Stability*. The role of native and other enzymes in the stability of meat and meat products is studied.

4. *Improved Processing Methods*. The knowledge obtained through this basic research is applied in the development of new and improved meat processing methods.

HIDES AND LEATHER LABORATORY

Chief: DR. J. NAGHSKI
(Acting: DR. E. M. FILACHIONE)

The Hides and Leather Laboratory does fundamental and applied research to develop better, more versatile, and more economical leathers. Its work is carried out in three areas of investigation, one dealing with the composition of hides and skins, the second with improvement of these materials by chemical modification, and the third with the various processes of hide preservation, leather manufacture, pollution reduction, and collagen conversion.

Composition Investigations

Head: DR. E. F. MELLON

1. *Properties of Hides and Skins*. A study is made of the composition, structure, and chemical and physical properties of animal hides and skins, their components and derivatives.

2. *Raw-Materials Composition and Finished-Materials Properties*. Relationships are established between the composition and structure of hides and skins and the properties of leathers, gelatins, and glues.

3. *Effects of Processing*. Selected processing operations are studied to determine their effects on the properties of hides and the products made from them.

4. *Analysis of Hide Components*. The proteins, mucoids, and lipoprotein complexes of hide are separated chemically and physically, purified, and identified.

5. *Test Methods and Instrumentation*. Physical and chemical methods and instrumentation are developed for determining composition, chemical structure, and physical properties of hide substances.

Chemical Modification Investigations

Head: DR. E. M. FILACHIONE

1. *Protein Complex in Hides.* Basic principles related to the chemical modification of the protein complex as it occurs in animal hides or derived proteinaceous products are developed.

2. *Chemical Reactivity of Hides.* The interaction between animal hides and various organic and inorganic reagents and chemicals is studied, including the reactivity of hides as a substrate for the graft polymerization of vinyl monomers.

3. *Evaluations of New Hide Derivatives.* The fundamental physical and chemical properties of new derivatives are evaluated, and the scientific results are correlated for potential use in the discovery of new applications for animal hides and the creation of hide materials with unique properties.

4. *Improved Leathers.* A more profitable utilization of animal hides is sought through the development of new or improved types of leather and other products.

Processing Investigations

Acting Head: W. F. HAPPICH

1. *New Uses Through New Processes.* New and improved methods for curing, preserving, unhairing, and tanning of hides are sought through the acquisition and evaluation of basic processing information, leading to the production of leathers with new and extended industrial uses.

2. *Collagen.* New uses for collagen, the protein constituent of hide, in food products and in animal and fish feed are sought and developed.

3. *Hide Defects.* Defects that develop in the hides and skins of living animals are investigated through cooperating agencies to determine the cause of such defects and the nature of the structural changes that attend them in order to develop procedures for detection, prevention, or eradication. Means are sought to improve the quality of rawstock so as to enhance the competitive position of leather.

4. *Test Methods.* Chemical and physical methods are developed for testing and evaluating the properties of hides, skins, and leather.

5. *Pollution.* Procedures are developed for reducing the environmental pollution that results from processing hides and skins into leather.

6. *Translation of Laboratory Results to Industrial Use.* Laboratory studies on the development of new processes for hide and collagen conversion and methods for pollution reduction are correlated so that counsel and advice can be provided to industry to permit the translation of laboratory discoveries to practical applications.

DAIRY PRODUCTS LABORATORY

Chief:

DR. B. H. WEBB*

The work of the Dairy Products Laboratory falls within five principal investigation areas. These are concerned with the study of dried milk products, fluid and concentrated milks, cheese and fermented products, butter and milk-fat, and allergens in dairy products.

Dried Milk Products Investigations

Head: DR. M. J. PALLANSCH*

1. *Chemistry.* The fundamental chemistry of dried milk products and of processes for their manufacture is studied with a view to improving them or developing new ones.

2. *Technology.* Pilot-plant processing of new or improved dried milk products is undertaken.

3. *New Products and Uses.* New and improved products are developed and methods are explored for increasing the use of dried milk in bakery goods and other food products.

4. *Methods and Instrumentation.* Chemical and physical methods and instrumentation for conducting basic investigations of dried milk products are developed and improved.

Fluid and Concentrated Milk Investigations

Head: DR. L. F. EDMONDSON*

1. *Improved Products and Processes.* The chemistry, technology, and pilot-plant processing of fluid and concentrated milks are studied to develop new or improved processes and products.

2. *Nutrition.* Fluid milk products are developed with improved nutritional characteristics by means of fortification with specific nutrients or modification of the normal complement of proteins, carbohydrates, fats, and trace constituents.

3. *Evaluation.* Chemical and physical methods and instrumentation for conducting investigations of fluid and concentrated milks are developed and improved.

Cheese and Fermented Products Investigations

Head: DR. J. A. ALFORD†

1. *Improved Products and Processes.* The chemistry, technology, microbiology, and pilot-plant production and processing of cheese and cheese foods are studied to develop new or improved products and processes.

*Washington, D. C.

†Beltsville, Md.

2. *Microbiology*. The microbiology of dairy foods is studied to ensure their safety and wholesomeness and to develop new products.

3. *Whey*. New or improved ways to fractionate and use whey and its components in cheese, other foods, or fermented products are sought through a study of whey microbiology, chemistry, biochemistry, and technology.

4. *Spores*. Fundamental biochemical and biophysical studies are made on the heat resistance and dormancy of microbial spores.

Butter and Milkfat Investigations

*Acting Head: DR. B. H. WEBB**

1. *New Milkfat Products*. The chemistry, technology, and pilot-plant processing of butter, butter-containing spreads, and butteroil (anhydrous milkfat) are studied to develop new or improved forms of these products.

2. *Milkfat Flavor*. Laboratory methods are developed for separating and identifying the flavor constituents of milkfat, for removing undesirable flavors, preserving and intensifying desirable flavors, and preventing off-flavor development in milkfat- and fat-containing products.

3. *New and Improved Products*. New and improved milkfat-containing food products are developed, using the natural and intensified milkfat flavor potential to increase the use of milkfat.

4. *Instrumentation*. Chemical and physical methods and instrumentation are developed and improved for butter and butterfat investigations and for studying the flavor components of milk products.

5. *Evaluation*. Statistically valid sensory tests are developed, and correlated with objective tests used to measure changes in the flavor of milk and milk products.

Allergens Investigations

*Head: DR. J. R. SPIES**

1. *Incidence of Milk Allergy*. The incidence of allergy to the known proteins of milk in either fluid milk or other dairy products, and to derived proteins that may be found after the ingestion of milk products, is determined.

2. *Isolation and Purification of Milk Allergens*. Allergens from fluid milks and whey are isolated and purified; the chemical groups responsible for allergic and immunological reactions are determined; and methods for deallergenizing fluid milk products are developed.

3. *New Antigens*. The chemistry, immunochemistry, and allergenicity of antigens in milk, whey proteins, and lactose, or new antigens generated in such products by enzymatic action, are studied.

4. *Immunoglobulins*. Immunoglobulins in dairy products are identified and quantified and their significance is assessed.

5. *Allergen Assay*. Milk allergen assay methods are developed using small experimental animals to replace skin tests on milk-sensitive patients.

*Washington, D. C.

MILK PROPERTIES LABORATORY

Chief:

DR. M. P. THOMPSON

The Milk Properties Laboratory conducts research on the chemical and biochemical properties of milk, milk components, and derived dairy products as a basis for their improved production and utilization. The chemical investigations involve both the protein and nonprotein components of milk and their interactions as affected by processing and modification, and the biochemical investigations are concerned with the enzyme systems, the colloidal properties, and the fermentation possibilities of milk and its components and derivatives.

Protein Investigations

Head: DR. W. G. GORDON

1. *Caseins and Whey Proteins.* The caseins and whey proteins and their components and fractions are isolated, purified, and characterized.

2. *Treatment of Proteins.* The effects of chemical and physical treatments on the milk proteins are studied, including changes in their physical characteristics, topochemical behavior, denaturation, and solution and functional properties.

3. *Effect of Processing.* Changes in milk properties upon heating, concentration, drying, freezing, and formulating are correlated with the molecular and micellar makeup of the proteins and their interactions with the solvent components.

4. *Protein-Nonprotein Associations.* The association of nonproteinaceous substances, both natural and added, with the major protein species is studied in molecular complexes, micelles, and larger aggregates.

5. *Derivatives.* Chemical derivatives of milk proteins are prepared and their chemical, physical, and functional properties are evaluated.

Nonprotein Components Investigations

Acting Head: DR. M. P. THOMPSON

1. *Lactose.* The properties of lactose and of its derivatives prepared by chemical modification are studied.

2. *Milk Composition.* The composition of milk and derived products is studied as it relates to flavor, nutritive value, and stability, and as it is influenced by the cow's feeding regimen.

3. *Milkfat Emulsion.* Factors influencing the stability of the milkfat emulsion are studied.

4. *Nutrition.* The natural mineral and vitamin constituents of milk and other dairy products, and improved carriers that may be useful for their fortification, are studied.

5. *Nonprotein Nitrogen.* The nonprotein nitrogenous components of milk are studied to determine their properties that may influence the usage of dairy products.

6. *Additives.* Additives, such as nutrient fortification substances, are studied to determine their effect on the properties of milk and other dairy products that may influence their utilization.

Biochemical Investigations

Head: DR. J. H. WOYCHIK

1. *Enzymes.* Endogenous milk enzymes are identified, purified, and characterized in a study of their structure, functions, activities, and specificities.

2. *Enzymic Effects.* Endogenous and/or added enzymes are studied for their influence on the stability, characteristics, flavor, and nutritive value of milk and other dairy products.

3. *Interactions of Milk Components.* The complex chemical, physical, and colloidal interactions of milk components are studied to determine their effect on the organoleptic, nutritive, stability, and other functional properties of dairy products.

4. *Biological Functions.* The biological functions of selected milk components are assessed and correlated with the structure of the components.

5. *Fermentation Studies.* The fermentation of lactose and other milk whey constituents are studied as a basis for their improved utilization.

PLANT PRODUCTS LABORATORY

Chief: DR. J. W. WHITE, JR.

The Plant Products Laboratory undertakes investigations on fruits and vegetables including potatoes, and maple sap and sirup, and also does analytical chemical research on these products as well as on the composition of other agricultural commodities assigned to the Eastern Division. There are five areas of investigation: fruits, potatoes and other vegetables, potato products, maple, and special plants.

Fruit Investigations

Head: DR. C. H. HILLS

1. *Study of Components.* The organic constituents of deciduous fruits are isolated and identified. Components that affect the color, flavor, aroma, texture, and nutritive value of processed fruit products are of particular interest.

2. *Improvement in Processing.* Basic information on the flavor of fruits and on their constituents—starch, sugars, organic acids, lipids, nitrogenous compounds, cell-wall material, pigments, and enzymes—is applied to obtain more efficient processing methods and higher-quality fruit products.

3. *Processing Quality.* The influence of variety, cultural practices, mechanical harvesting, and preprocessing treatments on the quality of processed fruit products is studied*

4. *New Products and Processes.* An extended use of Eastern deciduous fruits is sought through the development of new food products and processes.

5. *Methods and Instrumentation.* Physical and chemical methods and instrumentation necessary for the conduct of these investigations are developed and improved.

Potato and Other Vegetable Investigations

Head: DR. W. L. PORTER

1. *Study of Components.* The individual components of potatoes and other vegetables are isolated and identified. Those components that produce and control the color, flavor, texture, storage properties, and nutritive value of processed products are of particular interest.

2. *Improvement in Processing.* Basic information on the flavor of potatoes and other vegetables and on their constituents—starch, sugars, organic acids, lipids, nitrogenous compounds, cell-wall materials, pigments, and enzymes—is applied in this phase to obtain more efficient processing methods and higher-quality potato and other vegetable products.

3. *Varieties and Cultural and Storage Practices.* The influence of varieties and cultural and storage practices on the quality of potato and other vegetable products is studied.†

4. *New Products.* An extended use of Eastern potatoes and other vegetables is sought through the development of new food and industrial products that can be made from them.

5. *Methods and Instrumentation.* Physical and chemical methods and instrumentation necessary for the conduct of these investigations are developed and improved.

Maple Investigations

Head: DR. J. C. UNDERWOOD

1. *Composition of Sap and Sirup.* The organic constituents of maple sap and maple sugar and sirup are isolated, identified, and quantitatively determined.

2. *Flavor and Color Development.* The mechanism whereby maple sirup forms its flavor and color is determined.

3. *Microbiological Control.* Means are sought for controlling the microorganisms in sap which affect the flavor, color, and production of maple products.

*In cooperation with the Plant Science Research Division, ARS, and with State Experiment Stations.

†In cooperation with the Plant Science and Market Quality Research Divisions, ARS.

4. *Sap Collection and Sirup Processing.* Collecting and processing techniques are studied in the light of their effect on the quality and uses of finished sirup.

5. *Industrial Processes and Products from Maple.* Improved and extended industrial uses of maple sirup are sought by developing new processes and products.

6. *Methods and Instrumentation.* Physical and chemical methods and instrumentation for the conduct of these investigations are developed and improved.

Potato Products Investigations*

Head: R. L. SHAW, JR.

1. *Varieties and Cultural Practices.* The influence of varieties and cultural factors on the quality of commercial forms of processed potatoes is studied.†

2. *Storage.* The influence of storage environment on the quality of commercial forms of processed potatoes is studied.‡

3. *Composition of New Varieties.* The gross composition of new and experimental potato varieties is related to established processing methods and quality of products.†

4. *Processing Potential of New Varieties.* Laboratory methods are devised and developed to screen new and experimental varieties of potatoes for their processing potential.†

5. *Pilot-Plant Operations.* Integrated pilot plants are planned and operated to accurately foretell the effects of the cultural and varietal factors on a commercial scale.

6. *Product Evaluation.* Products are evaluated by appropriate subjective and objective methods.

Special Plant Investigations

Head: DR. C. L. OGG

1. *Evaluation Methods.* Chemical and physical methods for the evaluation of commodities under investigation in various Laboratories of the Division are developed and improved.

2. *Electronic Instrumentation.* Electronic instrumentation is developed for the conduct of research by the various investigations in the Division.

3. *Flavor Research.* Flavors and flavor precursors in plant products are identified.

4. *Special Analytical Techniques.* Microanalytical, mass spectrometric, and gas chromatographic techniques are applied to products of all Laboratories of the Division.

5. *Collaborative Studies.* Chemical and physical methods are evaluated in collaboration with outside laboratories.

*East Grand Forks, Minnesota. Operated in cooperation with the Minnesota and North Dakota Agricultural Experiment Stations and the Red River Valley Potato Growers Association.

†In cooperation with the Plant Science Research Division, ARS.

‡In cooperation with the Market Quality Research Division, ARS.

PHYSICAL CHEMISTRY LABORATORY

Chief:

DR. L. P. WITNAUER

The Physical Chemistry Laboratory is concerned with the determination of molecular structures, the development and application of mathematical procedures, the measurement of physical properties, and the investigation of the principles and techniques of separation science. The basic studies are applied to the constituents of and products from hides, fats, milk, meat, and other commodities assigned to the Division.

Molecular Structure Investigations

Head: DR. H. SUSI

1. *Physical Techniques.* Absorption spectroscopy, Raman spectroscopy, NMR spectroscopy, and other physical techniques are applied to develop information concerning the inter- and intramolecular structure of the constituents of hides, fats, meat, milk, and other products, and of pertinent model systems.

2. *Experimental and Mathematical Techniques.* Specialized experimental and mathematical techniques are developed and applied for structural studies, such as investigations on isotopically substituted molecules, precise measurements in aqueous solutions, investigations with polarized radiation, and adaptation of recent theoretical advances for solving specific problems.

3. *Relationship Between Structure and Properties.* Inter- and intramolecular parameters, such as hydrogen-bond energies, rotational barriers, molecular force constants, and the form of normal vibrations, as revealed through experimental studies in conjunction with pertinent calculations, are related to the chemical and physical characteristics of the products under investigation.

4. *Collaborative Studies.* Consultations and collaborative studies are carried out involving molecular spectroscopy and molecular structure.

Mathematical Investigations

Head: DR. C. R. EDDY

1. *Calculation of Molecular Data.* Mathematical methods and computer-based procedures are developed for obtaining basic molecular information from experimental measurements to assist research on milk, meat, animal fats, potatoes, and hides.

2. *Calculation of Material Properties.* Computer-based procedures are developed for obtaining information on properties of materials above the molecular level from experimental measurements such as dielectric properties, dynamic mechanical behavior, and X-ray diffraction for use in research on animal fats, milk constituents, and hides.

3. *Theoretical Computation of Molecular Properties.* Internal molecular properties not readily accessible to experimental measurements are computed theoretically for application to constituents of, and products from, animal fats, hides, milk, and meat.

4. *Consultations and Service.* Mathematical consultations and general computer services are provided.

Physical Properties Investigations

Acting Head: DR. L. P. WITNAUER

1. *Application of Existing Techniques.* Light scattering, osmotic pressure, ultracentrifugation, electron microscopy, electrophoresis, differential thermal analysis, rheometry, and mechanical, electrical, and other techniques are applied to determine the physical properties of, constituents of, and products from, such commodities as hides, animal fats, milk, and meat.

2. *New Techniques.* Such new techniques and apparatus as electrical birefringence and light scattering in an electric field are developed as needed for basic physical characterization of the constituents of various products.

3. *Evaluation Studies.* Components and derivatives of such products as hides and fats are evaluated through examination of their mechanical and thermal properties and other important end-use characteristics.

4. *Collaborative Studies.* Consultation and collaborative studies are carried out involving physical properties.

Separation and Composition Investigations

Head: DR. H. L. ROTHBART

1. *Separation Techniques.* Chromatography, counter-current distribution, zone refining, and other separation techniques are studied to develop information about the composition of such products as animal fats, meat, and milk.

2. *Principles of Separation Processes.* The basic principles underlying separation processes, including equilibrium and transport phenomena, are determined in order to develop the mathematical representations required to predict efficient separations of components of various products.

3. *New and Improved Separation Procedures.* New and improved methods and instrumentation are developed for the separation of components of various products.

4. *Collaborative Studies.* Consultation and collaborative studies are carried out with other research units on problems in separation science.

ENGINEERING AND DEVELOPMENT LABORATORY

Chief:

N. C. ACETO

The Engineering and Development Laboratory, which originates, evaluates, and develops new processes on a pilot-plant scale, is working in four areas of investigation. Two of these are concerned with new and improved products—food, feed, and industrial—from the animal and plant commodities assigned to the Eastern Division. The other two areas concern the analysis of the properties of the products developed and the design of equipment to make them. As a special staff function, the commercial feasibility of projects proposed or under way is analyzed.

Commercial Feasibility

Group

V. A. TURKOT

Pilot-plant research is evaluated before it is undertaken to determine the likelihood of economic success, cost factors are investigated in the course of the research, and large-scale production costs are projected to appraise the commercial potential of processes developed or proposed in the Division.

Animal Products Investigations

Head: H. I. SINNAMON

1. *New and Improved Products.* New and improved products from animal sources are originated, evaluated, and developed on a pilot-plant scale.

2. *Methods and Equipment.* The methods and standard equipment best suited to the preparation of the products are determined and the functional requirements for new equipment, where necessary, are established.

3. *Pilot-Plant Operation.* Integrated pilot plants are planned and operated to obtain engineering research data.

4. *Advice to Industry.* Plans are developed for semi-works and large-scale processing as a basis for advising industry on the commercialization of developments.

Plant Products Investigations

Head: J. CORDING, JR.

1. *New and Improved Products.* New and improved products from plant sources are originated, evaluated, and developed on a pilot-plant scale.

2. *Methods and Equipment.* The methods and standard equipment best suited to the preparation of the products are determined and the functional requirements for new equipment, where necessary, are established.

3. *Pilot-Plant Operation.* Integrated pilot plants are planned and operated to obtain engineering research data.

4. *Advice to Industry.* Plans are developed for semi-works and large-scale processing as a basis for advising industry on the commercialization of developments.

Product Analysis Investigations

Head: E. S. DELLAMONICA

1. *Chemical and Physical Analysis.* Analytical methods for measuring the chemical and physical properties of products under development in the Laboratory are selected, modified, and applied.

2. *Microbiological Analysis.* Microbiological techniques to assure that newly developed products meet high sanitary standards are improved, developed, and applied.

3. *Sensory Analysis.* Objective and organoleptic procedures are applied to analyze the odor, taste, and texture of food products under development to evaluate their quality, storage characteristics, and end uses.

4. *Evaluation.* The analytical results are evaluated as a guide for engineering pilot-plant experimentation.

Equipment and Design Investigations

Head: W. K. HEILAND

1. *Design Requirements.* The design requirements of processing equipment are determined from experimental data obtained in the pilot plant by other Investigations of the Laboratory.

2. *Specialized Equipment.* Mechanical designs are originated and created for specialized pilot-plant equipment not available commercially for experimental use by the engineering teams.

3. *Modification of Equipment.* Standard equipment units are modified to adapt them to new uses by the engineering research teams.

4. *Scaling Up of Equipment.* Original designs and modifications are projected to a larger scale to adapt them for commercial use.

PIONEERING RESEARCH LABORATORY OF PHYSICAL BIOCHEMISTRY

Principal Scientist: DR. S. N. TIMASHEFF*

This Laboratory seeks an understanding, on the most fundamental level, of the structure of biological macromolecules and the relation of this structure to their activity or function. Investigations encompass such problems as determination of the gross and fine structure of proteins and nucleic acids in solution; effects of interactions between macromolecules, as well as between macromolecules and small molecules and solvent components, on the conformation and activity of the macromolecules; effects of mutations and the existence of polymorphism on the biophysical properties of the molecules; and development of new theories and experimental methods that will advance scientific knowledge of biological macromolecules and the nature of their functions.

*Brandeis University, Waltham, Mass.

DIRECTORY

HEADQUARTERS

Eastern Marketing and Nutrition
Research Division

600 E. Mermaid Lane, Wyndmoor, Pa. 19118

215-247-5800

(FTS: 215-247-5, followed by 3-digit Ext. No.)

Room		Phone Extension
3032	Aceto, N. C.	247
3024	Cording, J., Jr.	280
2028	Corrigan, G. A.	240
2206	DellaMonica, E. S.	307
0024	Eddy, C. R.	310
2205	Feairheller, S. H.	367
2000	Filachione, E. M.	227
0023	Gaspari, D.	296
1112	Gordon, W. G.	333
1205	Happich, W. F.	217
3028	Heiland, W. K.	282
3116	Hills, C. H.	270
3004	Krider, M. M.	212
3104	Linfield, W. M.	236
3015	Maerker, G.	244
3122	Mellon, E. F.	363
1032	Miller, R. L.	202
2024	Moyer, D. B.	241
1013	Naghski, J.	225
1004	Newman, E. J.	215
1128	Ogg, C. L.	343
3119	Porter, W. L.	322
2012	Roberts, N. E.	214
2118	Rothbart, H.	278
2109	Schmeltz, I.	353
3008	Scott, W. E.	266
3006	Seibles, T. S.	230
2130	Silbert, L. S.	249
1032	Sills, M. W.	218
3026	Sinnamon, H. I.	281
3004	Stedman, R. L.	210
1124	Susi, H.	340
2110	Swift, C. E.	350
1030	Thompson, M. P.	285
1032	Treadway, R. H.	209
3036	Turkot, V. A.	373
2104	Underwood, J. C.	349
3010	Walens, H. A.	385
3205	Wasserman, A. E.	369
2034	Wegner, M. I.	243
3000	White, J. W., Jr.	231
1026	Witnauer, L. P.	226
2032	Wolff, I. A.	242
1104	Woychik, J. H.	332
3101	Wrigley, A. N.	229

DAIRY PRODUCTS LABORATORY

South Building, USDA
14th St. & Independence Ave., SW.
Washington, D. C. 20250

202 REpublic 7-4142

To call directly, dial DUdley 8, then extension
(FTS: 202-388, followed by 4-digit Ext. No.)

Room		Phone Extension
0640	Edmondson, L. F.	5006
0612	Pallansch, M. J.	2484
0134	Spies, J. R.	2607
1655	Webb, B. H.	2364

CHEESE AND FERMENTED PRODUCTS INVESTIGATIONS

Agricultural Research Center
Building 157
Beltsville, Md. 20705

301 GRanite 4-4800, Ext. 215
(FTS: 301-474-4215)

Alford, J. A.

POTATO PRODUCTS INVESTIGATIONS

Red River Valley Potato Research Center
P. O. Box 113
East Grand Forks, Minn. 56721

218-773-2473
(FTS: 701-774-6344)

Shaw, R. L.

PIONEERING RESEARCH LABORATORY OF PHYSICAL BIOCHEMISTRY

Graduate Department of Biochemistry
Brandeis University
Waltham, Mass. 02154

617-894-6000, Ext. 547
(FTS ASST.: 617-223-2100)

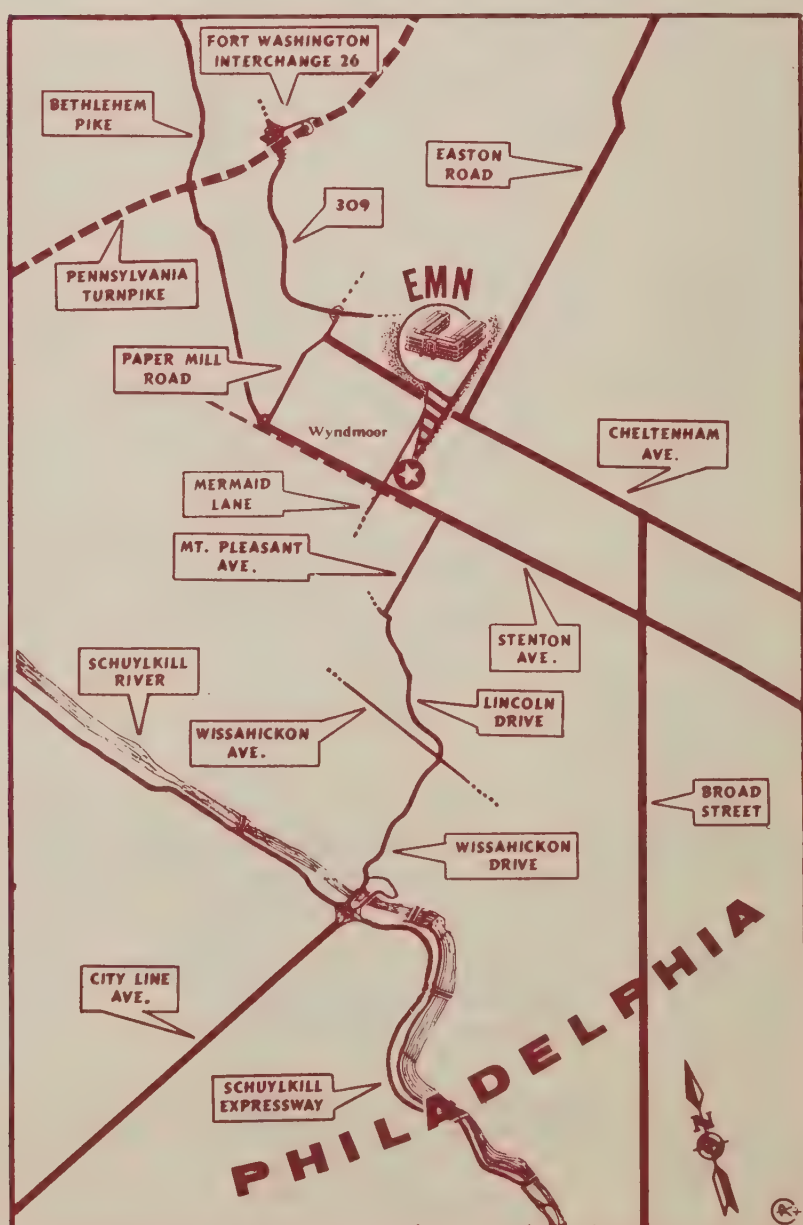
Timasheff, S. N.

HOW TO REACH THE EMN LABORATORIES

Wyndmoor, Pa.

By air. The Philadelphia International Airport is about 18 mi. south of the Wyndmoor laboratories. Take taxi or airport limousine to one of the downtown railroad stations given below. To drive, turn right from airport parking lot on Essington Avenue and go 1 mi. to traffic circle. Bear right on Penrose Avenue following sign to "Center City Schuylkill Expressway." Continue for 2.3 mi. to 26th Street, then turn left. From here, go 8.7 mi., following Schuylkill Expressway (Interstate 76) to U. S. 1. Instructions for getting to the Laboratories from the expressway are given below.

By car. From the south, approach Philadelphia on U. S. 1 (City Line Avenue) or use Schuylkill Expressway. Leave expressway at City Line Avenue at exit marked "City Avenue Bridge, Germantown, Chestnut Hill." Cross bridge over the Schuylkill River and follow signs to Wissahickon Drive. Proceed on the drive (which becomes Lincoln Drive) for 4.8 mi. to Mt. Pleasant Avenue. Turn right and go 1.3 mi. to Stenton Avenue, then turn left and go 0.9 mi. to Mermaid Lane, then turn right. Laboratories are on the right side of Mermaid Lane, 0.2 mi. from Stenton Avenue.



From the north, east, and west, the point most accessible by car to the Wyndmoor Laboratories is the Fort Washington Interchange of the Pennsylvania Turnpike. From here, follow Pa. 309 south for 2.4 mi. to Paper Mill Road exit. Turn right and go 0.3 mi. to Cheltenham Avenue, then left and go 1.2 mi. to Mermaid Lane, then turn right. Laboratories are on left side of Mermaid Lane 0.9 mi. from Cheltenham Avenue.

By Penn Central Railroad. Take Chestnut Hill train from Philadelphia at Penn Center, 16th Street and Kennedy Boulevard; at 30th Street Station; or at North Philadelphia Station. Laboratories are 1½ mi. from Chestnut Hill Station. Take a taxi or a south-bound "L" bus marked "Broad-Olney Subway" to Stenton Avenue and Mermaid Lane and walk left 2 blocks to the Laboratories.

By Reading Railroad. Take Chestnut Hill train from Philadelphia at Reading Terminal, 12th and Market Streets; at North Broad Street Station; or at Wayne Junction. Get off at Wyndmoor. Laboratories are 5 blocks north of station on Mermaid Lane.

By local transportation. Take a Broad Street Subway train to Olney Avenue. Get transfer when paying fare. Transfer to "L" bus marked "Erdenheim" at northwest corner of Broad Street and Olney Avenue. Get off bus at Mermaid Lane and Stenton Avenue, and walk right 2 blocks to the Laboratories.

Washington, D. C.

The Dairy Products Laboratory (except for the Cheese and Fermented Products Investigations) is located in the South Building (6th wing, 1st floor and basement) of the U. S. Department of Agriculture at 14th Street and Independence Ave., SW., near the Washington Monument.

Beltsville, Md.

The Cheese and Fermented Products Investigations group of the Dairy Products Laboratory is located in the Dairy Products Building (Bldg. 157) at the Agricultural Research Center, Beltsville, Maryland. The Center lies between U. S. 1 and the Baltimore-Washington Parkway, about 15 miles northeast of Washington, D. C. It is reached conveniently only by automobile, since it is about 2 miles from the Beltsville stop of the Greyhound and Trailways buses on U. S. 1.

East Grand Forks, Minn.

The Potato Products Investigations are carried on at the Red River Valley Potato Research Center, located on U. S. 202 and 9th Avenue South, in East Grand Forks, Minnesota. This is just about a mile from the DeMer Bridge crossing the Red River from Grand Forks, North Dakota.

Brandeis University

The Pioneering Research Laboratory of Physical Biochemistry is located in the Graduate Department of Biochemistry at Brandeis University. The Brandeis campus is in Waltham, Massachusetts, about 10 miles west of Boston, 2 miles from Exit 51 on Route 128.

NOTES

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* NATIONAL AGRICULTURAL LIBRARY



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